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A LEVEL MATHS

(58) Vector Notation (Column and i and j form)

WORKING AT D/E

(1) Given that **a** = **i** – 2**j** **and b** = 4**i**+5**j**, find, in terms of **a** and **b:**

(i) **a** + **b** (ii) **a - b** (iii) 2**a** + 3**b**
(iv) 4**a** (v) -2**b** (vi) 3**(a – b)**

(2) Given that **a** = $\begin{pmatrix}2\\4\end{pmatrix}$, **b** = $\begin{pmatrix}0\\-3\end{pmatrix}$ and **c** = $\begin{pmatrix}-1\\2\end{pmatrix}$ find column vectors for:

(i) **a** + 2**b** (ii) 3**a - b** (iii) 2**a**
(iv) 4**b** (v) -3**c** (vi) 5**(a – b)**

(3) In the triangle OAB, $\overrightarrow{OA} = 2\mathbf{p} - 3\mathbf{q}$ and $\overrightarrow{OB} = \mathbf{p} + 7\mathbf{q}$
Find an expression in terms of **a** and **b** for $\overrightarrow{AB}$.

WORKING AT B/C

(1) **a** = $\begin{pmatrix}p\\6\end{pmatrix}$, **b** = $\begin{pmatrix}4\\q\end{pmatrix}$ and **c** = $\begin{pmatrix}-2\\4\end{pmatrix}$

Given that 3**a** + 2**b** = 5**c**, find the values of p and q.

(2) In the triangle OAB, $\overrightarrow{OA} = 9\mathbf{p} + 2\mathbf{q}$ and $\overrightarrow{AB} = 5\mathbf{p} - 3\mathbf{q}$
Find an expression in terms of **a** and **b** for $\overrightarrow{OB}$.

(3) Given that **a** = $\begin{pmatrix}p\\-4\end{pmatrix}$ is parallel to **b** = $\begin{pmatrix}5\\-12\end{pmatrix}$ find the value of p.

WORKING AT A*/A

(1) Given that the resultant of the vectors **a** = **i** – 2**j** and **b** = p**i** +2p**j** is parallel to the vector **c** = 4**i** +5**j** .
(a) Find, the value of p as a simplified fraction.
(b) Which has the greatest magnitude, the resultant of **a** and **b** or the vector **c**? You must show workings.

(2) **a** = 4**i** + 6**j** and **b** = -4**i** +10**j**
Given that **a** + μ**b** is parallel to the vector **i** + **j**, find the exact value of μ.